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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/813,719

03/31/2004

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HALB:051

7420

7590

01/28/2009

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EXAMINER

GAKH, YELENA G

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

01/28/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,719	Applicant(s) BELL ET AL.	
	Examiner Yelena G. Gakh, Ph.D.	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,8-14,17,18,32,37,46 and 47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8-14,17,18,32,37,46 and 47 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. RCE and amendment, filed on 12/17/08, are acknowledged. Claims 2-7, 15-16, 19-31 33-36 and 38-45 are cancelled. Claims 1, 8-14, 17-18, 32, 37 and 46-47 are pending in the application and considered on merits.

Response to Amendment

2. The amendment filed 12/17/08 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "identifying the shift in the NMR response that distinguishes the drilling fluid from formation fluid". While the terms used by the Applicants are not conventional terms of the art, the examiner interprets this as changing chemical shift of the NMR signal upon adding of the paramagnetic species, which is not disclosed in the specification. The specification discloses only changes in T₂ relaxation time, rather than changes in NMR chemical shifts.

Applicant is required to cancel the new matter in the reply to this Office Action.

3. In response to the amendment the examiner slightly modifies rejections established in the previous Office action. Furthermore, the examiner establishes an objection to the specification.

Specification

4. The specification is objected to as disclosing the statements that are not technically correct. For example, the statement that "persistent organic radicals are free electrons" is not a correct statement (see page 5, paragraph [0010]). The radicals are not "free electrons". Free electrons (especially flowing free electrons) are an electrical current. Free electrons have nothing to do with radicals. Radicals are rather atoms with an unpaired electron. There is a conventional term "stable radicals" - is that, what is meant by the name "persistent radicals"? The radical cannot "pair" with another electron. The radical can "pair" with another radical. Therefore, the statement is misleading and incorrect.

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Claim Objections

5. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 10 recites taking at least one core sample from the region of said formation, which is inherent to the parent claim, since the parent claim recites analyzing the formation, which inherently requires taking the sample for analysis.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1, 8-14, 17-18, 32, 37 and 46-47 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The examiner respectfully reminds the Applicants that according to MPEP §2163:

"2163.02. Standard for Determining Compliance with Written Description Requirement:

The courts have described the essential question to be addressed in a description requirement issue in a variety of ways. An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Under *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed. The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon "reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter." *Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (quoting *In re Kaslow*, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)). Whenever the issue arises, the fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed.

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See, e.g., *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Possession may be shown in a variety of ways including description of an actual reduction to practice, or by showing that the invention was "ready for patenting" such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention. See, e.g., *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 68, 119 S.Ct. 304, 312, 48 USPQ2d 1641, 1647 (1998); *Regents of the University of California v. Eli Lilly*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997); *Amgen, Inc. v. Chugai Pharmaceutical*, 927 F.2d 1200, 1206, 18 USPQ2d 1016, 1021 (Fed. Cir. 1991) (one must define a compound by "whatever characteristics sufficiently distinguish it").

Currently amended claim 1 recites:

A method of distinguishing oil based drilling fluid from subterranean formation fluid hydrocarbons during nuclear magnetic resonance testing while drilling a borehole in the subterranean formation, said method comprising:

drilling a borehole in a subterranean formation using oil based drilling fluid;
during the drilling, adding paramagnetic species to the drilling fluid, wherein said paramagnetic species comprises Fe^{3+} , Mn^{2+} , Ni^{2+} , and Cu^{2+} , Gd^{3+} , tetramethyl-piperdinenyl-1-oxyl ions or combinations thereof;

and circulating the drilling fluid containing the paramagnetic species in the borehole prior to said testing, wherein the testing comprises logging the borehole, taking nuclear magnetic resonance measurements of the subterranean formation during the logging, and identifying *the shift in the NMR response* that distinguishes the drilling fluid from formation fluid hydrocarbons.

The specification discloses in Experimental part adding paramagnetic ions (Fe^{3+} or Mn^{3+}) to commercially available synthetic drilling fluid base, ACCOLADE[®], with a fully expected results of shortening relaxation times T_2 of the fluid and thus broadening its NMR signals. Nothing that resembles the method recited in claims 1 and 8 is disclosed in the specification in the experimental part. Therefore, the Applicants did not show possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention, and did not reasonably convey "to the artisan that the inventor had possession at that time of the later claimed subject matter". The specification does not disclose any "shift in the NMR response" - there is signal broadening, which is not changing the chemical shift.

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Furthermore, the specification does not disclose, as to how it is possible to distinguish oil based drilling fluid comprising paramagnetic species from subterranean formation fluid hydrocarbons, when the oil based drilling fluid readily intermixes with the formation hydrocarbons, with the latter being susceptible to exactly the same influence of paramagnetic species, as the drilling fluid, and with the same effect of paramagnetic species on the NMR spectra lines, as for the oil drilling fluid. The problem if intermixing the drilling oil-based fluid and the formation hydrocarbons is also indicated in the prior art, see Ramakrishnan et al. (US 7,134,500), "when a well is drilled with oil-based-mud (OBM) the filtrate may miscibly mix with the formation fluid" (see col. 1, lines 48-50). It is well known for a person of ordinary skill in the art (as well as for a person skilled in the art and for an expert in the art) that the presence of even traces of paramagnetic impurities in the sample leads to a significant broadening of NMR spectral lines.

Furthermore, the specification discloses the following:

"[0009] The present invention provides a nuclear magnetic resonance (NMR) method for detecting the presence and preferably also the amount of any invasion or filtration of oil-based drilling fluid into a subterranean formation from a borehole penetrating the formation and drilled with the drilling fluid. That is, the present invention provides a method for distinguishing native or residual hydrocarbons in a formation from oil-based drilling fluid so that the drilling fluid does not distort the detection or measurement of such hydrocarbons using nuclear magnetic resonance."

"[0021] In the present invention, a method is provided for enhancing the contrast in the NMR tool response between oil-based drilling fluids and the formation oil so that hydrocarbons may be detected, oil or residual oil saturation determined, and/or contamination by drilling fluid in the formation, may be analyzed with NMR tools."

The specification is silent regarding "a method of detecting hydrocarbon-bearing zones in a formation penetrated by a borehole" as recited in claims 8-10, "a method of detecting or identifying characteristics of hydrocarbons in the formation surrounding a borehole drilled with oil-based drilling fluid" as claimed in claims 11-13, "a process of analyzing the fluid composition of a subterranean formation" as claimed in claims 14-18, or "a method of drilling a borehole in a subterranean formation" as claimed in claims 32 and 37.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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9. Claims 1, 8-14, 17-18, 32, 37 and 46-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 8, 11, 14, 32 and 37 recite "shift in the NMR response". It is not clear, as to what this expression might mean. Is this a change in NMR chemical shift? What is NMR response? Is this an NMR signal? The expression "shift in the NMR response" renders all claims unclear and indefinite.

Claim 14 recites "a process of analyzing the fluid composition of a subterranean formation". Conventionally subterranean formations are complex mixtures of hydrocarbons with overlapping signals in NMR spectra. It is unclear from the claim, as to what is meant by the expression "analyzing the fluid composition of a subterranean formation", since the specification does not provide any disclosure for this type of analysis, which makes it unclear, as to what is meant by the expression, and which are the metes and bounds of the subject matter of the claim. The examiner respectfully reminds the Applicants, that according to the second paragraph of 35 U.S.C. 112, "[t]here are two separate requirements set forth in this paragraph: (A) the claims must set forth the subject matter that applicants regard as their invention; and (B) the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant."

Claim Rejections - 35 USC § 102/103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. **Claims 1, 8-14, 17-18, 32, 37 and 46-47** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kleinberg (US 6,346,813).

Kleinberg discloses "magnetic resonance method for characterizing fluid samples withdrawn from subsurface formations" (Title) and teaches, "[d]issolved paramagnetic compounds will reduce the proton relaxation times of oils. Thus if two oils have the same viscosity, they will have different relaxation times if they have substantially different paramagnetic content. While many crude oils and most oil base mud filtrates have negligible

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magnetic content, some crude oils have significant amounts of vanadium or nickel [Tissot and Welte, "Petroleum Formation and Occurrence", Springer-Verlag, 1978, Figure IV.1.20]. Because the relaxation effect is proportional to paramagnetic concentration, the proportions of two oils in a mixture can be monitored. *Deliberate introduction of an oil-soluble paramagnetic substance into the oil base mud can considerably enhance this effect when the native crude is relatively free of paramagnetic material*" (col. 8, lines 5-18). Kleinberg specifically indicates that paramagnetic substances are salts of the transition metals: "[u]npaired electrons are found in naturally occurring or *artificially introduced magnetic transition metal ions such as iron, manganese, chromium, cobalt, vanadium and nickel*. These last two are frequently found in crude oils. Chromium is found at high concentration in a number of water base mud filtrates. Natural ground water has significant iron content. In general, mud filtrates and formation fluids will have different concentrations of transition metal ions" (col. 9, lines 31-37).

Thus Kleinberg teaches adding oil-soluble paramagnetic species into the oil-based drilling mud during drilling operation (with inherent circulation of the fluid in the borehole) and differentiating the mud from the formation fluid using NMR spectra by determining different values of relaxation parameters of NMR spectra of the mud and the formation, which covers the subject matter of the indicated claims; the claims directed toward detecting hydrocarbon-bearing zones are obvious in the light of differentiating between the oil-based mud with added paramagnetic species and hydrocarbon fluid formation with NMR spectroscopy.

Response to Arguments

12. Applicant's arguments filed 12/17/08 have been fully considered but they are not persuasive.

Objection to claim 10. Analysis of a sample requires "taking the sample" for analysis, specifically "a core sample from the region of said formation" for analysis of the formation fluid. It does not matter, *how* this sample is taken; the fact is that it has to be taken to be analyzed. Claim 10 only recites "taking at least one core sample from the region of said formation" - the step, without which performing the method of the parent claim is impossible.

Rejection of the claims under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The Applicants state "that it is error for the Examiner to

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select a few paragraphs from the specification for her rejections when the law requires that the specification be read in its entirety. Applicants respectfully submit that one of ordinary skill in the art, reading the specification in its entirety, would well understand the invention and find the claims to be fully supported by the disclosure. Nevertheless, Applicants have further amended the claims for the Examiner's consideration herewith." The examiner considers the amendment as not curing the deficiencies of the previously submitted claims regarding written description. The examiner did not find anywhere in the specification any examples of discerning between the drilling fluid and the formation the way it is recited in the claims based on "shift in the NMR response". Moreover, the examiner did not find any disclosure related to "the shift in the NMR response", and is not quite sure, as to what this might be.

The Applicants remark that "it was and remains apparent to Applicants that they/their counsel and the Examiner are not understanding one another and that the Examiner is not appreciating or understanding the invention, because she is not seeing it through the eyes of one of ordinary skill in the art. Applicants' counsel in turn has great difficulty understanding the Examiner's rejections." First of all, when the Applicants believe that they have "difficulty understanding the Examiner's rejections", the Applicants always have an option of a telephone interview to clarify examiner's position on specific issues. Second, the Applicants' statement that "the Examiner is not appreciating or understanding the invention, because she is not seeing it through the eyes of one of ordinary skill in the art" does not seem to have any grounds. The Applicants further state that the invention is basically not related to NMR spectroscopy, and that "the invention is about finding oil". If the invention were "about finding oil", the examiner believes, it would have been classified in a totally different class related to petroleum industry (class 299 or class 166).

The following Applicants' statement is quite puzzling to the examiner:

"The NMRs with which the Examiner is familiar in working in leading NMR laboratories are far more sophisticated and powerful than the NMRs used in oilfield analysis. They are really not used in the same way and Applicants respectfully submit that the Examiner would not even recognize an NMR used in the oilfield as an "NMR" when compared to the ones with which the Examiner is so very familiar. To help the Examiner understand, Applicants advise that the NMRs that would typically be used in Applicants' invention are 1 hertz units."

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First, it is not clear, what *are* NMRs? NMR, or Nuclear Magnetic Resonance, is a natural phenomenon, and to the examiner's understanding, there is just one nuclear magnetic resonance, although the resonance occurs for different nuclei. What does it mean that NMRs **are** not used in the same way as in the oilfield industry, if NMR is used for determining and/or changing relaxation times in oilfield industry? Furthermore, NMR spectroscopy of petroleum and crude oils is a very complex and sophisticated field, with multidimensional and multinuclear NMR pulse sequences applied for analysis of crude oils. The phrase "Applicants advise that the NMRs that would typically be used in Applicants' invention are 1 hertz units" is the most puzzling the examiner could think of. What does it mean? Nuclear magnetic resonance occurs in MHz-GHz range, i.e. 10^6 - 10^9 Hz - this is the resonance frequency of the nuclei for the field of 10-20 Tesla; even for Earth magnetic field the resonance frequency of nuclei is about 2 kHz. The units that are used for measuring coupling constants are in fact given in Hz, but the examiner did not find any measurements of coupling constants in the instant application.

It is not quite clear to the examiner, as to what is so specific in logging and drilling that the examiner would not be able to understand. The Applicants state that the examiner "discouraged" the Applicants from the interview - the examiner does not recall any discouraging of any applicants from telephone interviews.

Rejection over the prior art. The Applicants' arguments regarding Kleinberg's prior art are not clear to the examiner. The examiner is not quite sure, as to what is the difference between Kleinberg's method, which comprises comparing NMR spectra of the drilling and formation fluids upon adding paramagnetic additives to the drilling fluid, including Ni^{2+} , and the instant claimed method. The Applicants make the following statement:

"The Examiner has advised that she expects a "comparative analysis of the claimed subject matter of the instant invention vs. the disclosure" of Kleinberg, "with specific indication of distinctions between these disclosures." Applicants object that it is improper for the Examiner to order such unduly burdensome and costly testing and comparative data from the Applicants. Moreover, Applicants would have to use the benefit of their own invention to make this comparative analysis, which would be improper use of hindsight."

The examiner respectfully refers the Applicants to MPEP 714.02:

"b) In order to be entitled to reconsideration or further examination, the applicant or patent owner must reply to the Office action. *The reply by the applicant or patent owner must be reduced to a writing which distinctly and specifically points out the supposed errors in the*

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*examiner's action and must reply to every ground of objection and rejection in the prior Office action. **The reply must present arguments pointing out the specific distinctions believed to render the claims, including any newly presented claims, patentable over any applied references.** If the reply is with respect to an application, a request may be made that objections or requirements as to form not necessary to further consideration of the claims be held in abeyance until allowable subject matter is indicated. The applicant's or patent owner's reply must appear throughout to be a bona fide attempt to advance the application or the reexamination proceeding to final action. A general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references does not comply with the requirements of this section.*

*(c) In amending in reply to a rejection of claims in an application or patent under reexamination, **the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made.** The applicant or patent owner must also show how the amendments avoid such references or objections."*

Thus, the Applicants' statements that "it is improper for the Examiner to order such unduly burdensome and costly testing and comparative data from the Applicants" and "[m]oreover, Applicants would have to use the benefit of their own invention to make this comparative analysis, which would be improper use of hindsight", are at least incorrect. In fact, this is the Applicants' **duty** to perform corresponding comparative analysis of the claim language and the disclosure of the prior art in order to specifically indicate differences between the claim language and the disclosure. Such analysis has not been performed by the Applicants.

Further Applicants statement that "the shifting of the NMR response - the moving of where the peak comes out - is far more important in distinguishing the drilling fluid from the formation fluid than is the more or less broadening of the lines or peaks as seen with Kleineberg" is just amazing. All examples of the instant specification are related to determining broadening of the peaks (shortening of T₂ relaxation times) upon adding paramagnetic additives, and now it appears that this is not what the Applicants disclose. The examiner is just perplexed.

The examiner suggests the Applicants to use conventional terminology of the field, which in this case is NMR spectroscopy of the formation fluids: "shifting of the NMR response" should be called "changing of the chemical shift", because "where the peak comes out" is in fact "chemical shift of the NMR signal".

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yelena G. Gakh/
Primary Examiner, Art Unit 1797

01/26/2009